

**Transportation Data Office**

# **Better Decisions Through Better Data**



**Washington State  
Department of Transportation**





Front cover: Aerial view of the Tacoma Narrows Bridge.  
*WSDOT Geographic Services Office - Aerial Photography Branch.*  
The average daily traffic volume for 2003 on this bridge was 85,456.

Above: State Highway 522 off ramp at 164th Avenue SE (Tester Road).  
*Photo provided by Reid Middleton, Inc. - Everett, WA.*  
The Transportation Data Office provides data used to design roadways such as this recently constructed roundabout.

## A note from the Secretary of Transportation

We depend on our Transportation system virtually each and every day of our lives.

Developing, operating, and maintaining these transportation facilities and programs to meet citizens' needs requires decisions about transportation safety, capacity, access, and efficiency at both the state and local level. Good decisions rely on good information. For instance: What can we expect will happen if a shopping mall is built here? What are the best ways to improve safety along a high accident corridor? Where and what type of collisions are happening? Where are the major freight-hauling highways? Where is growth happening and how will we accommodate it?

WSDOT's Transportation Data Office helps collect, record, analyze and report the information that makes good transportation decisions possible. Whether you are a local planner, an engineer, government official, or a citizen looking for information on transportation topics, we hope you will find this booklet a valuable resource.

Sincerely,

A handwritten signature in black ink, reading "Douglas B. McDonald". The signature is fluid and cursive, with the first name "Douglas" being the most prominent.

Douglas B. McDonald  
Secretary of Transportation

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## Further Information

The content in this booklet is also available at the TDO website and is updated regularly to provide you with the most current information.

### TDO Communication Plan

<http://www.wsdot.wa.gov/mapsdata/tdo/communication.htm>

### TDO Website

<http://www.wsdot.wa.gov/mapsdata/tdo>

### TDO e-mail Web Support

[tdowebmaster@wsdot.wa.gov](mailto:tdowebmaster@wsdot.wa.gov)

# State Highway Roadway Data

## How does WSDOT locate and identify the length of a state route, and associate objects and events along the route?

The TDO establishes and maintains a Distance Measuring Instrument/ Linear Referencing System (DMI/LRS) on all state highways. A DMI is a carefully calibrated one-dimensional (no geographic coordinates - length only) survey odometer that measures the distance a vehicle has traveled. The DMI based LRS is only collected in one direction of travel, typically northbound for odd numbered routes and eastbound for even numbered routes. The southbound data is referenced from the northbound mile posting and the westbound data is referenced from the eastbound mile posting.

Because of a need for a more accurate geographic location referencing system, data is now being collected using Global Positioning System (GPS) technology. (See GPS/LRS Mainline)

## How do you uniquely identify state highway locations using a DMI-based linear referencing system?

To uniquely identify locations on a state route system, these *key* fields are required:

- State Route (SR), e.g., 002, 012, 512
- Related Roadway Type (RRT), e.g., couplet (CO), spur (SP)  
RRT value is blank on mainline routes
- Related Roadway Qualifier (RRQ), e.g., ABERDN, SUMAS  
RRQ value is blank on mainline routes
- State Route Milepost (SRMP) or Accumulated Route Mile (ARM)
- Ahead/Back (A/B) Indicator  
A/B value is blank on ahead mileage  
A/B value is only required when using SRMP
- Direction of Inventory, i.e., increasing (I), decreasing (D) or both (B)
- Reference Date - It is important to include the date of collection as part of the key. This date will allow you to update the location if a realignment occurs.

### Sample locations using key fields:

SR	RRT	RRQ	SRMP or ARM	A/B Indicator	Direction of Inventory	Reference Date
101	CO	ABERDN	87.49		I	12/31/2001
002			207.78	B	D	12/31/2002

### How is location data kept current when the length of a roadway is changed?

The Transportation Information and Planning Support (TRIPS) system keeps track of locations when roadway lengths change. Changes (realignments) may occur due to construction or Route Jurisdictional Transfers (RJT), such as when the state acquires a section of roadway from local jurisdictions.

Highways are measured using Accumulated Route Mileage (ARM) and State Route Milepost (SRMP). ARM is an accrual of mileage from the beginning of

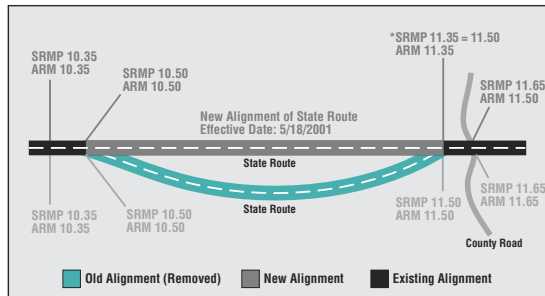
a route to the end of the route and is an important factor in the realignment of a state route. ARM is an accurate measure of accrued mileage and changes when realignments occur.

SRMP is a method of identifying the location of various physical features and events along a state highway with respect to the original route before any realignment. SRMP is used for reference purposes and may not be an accurate measure of accrued mileage from the beginning of the route.

If a realignment shortens or lengthens a section of a state route, a process referred to as the ARM/SRMP calculation module is used to equate the old alignment with the new alignment.

For more documentation on the DMI/LRS visit:  
[http://www.wsdot.wa.gov/mapsdata/tdo/dmi\\_lrs.htm](http://www.wsdot.wa.gov/mapsdata/tdo/dmi_lrs.htm)  
 or for more information contact (360) 570-2361

### Example of a Realignment



## ARM/SRMP Calculation Module

### A Conversion Tool for Updating Key Location Information After Realignment

The ARM/SRMP Calculation Module allows highway features and events gathered at different reference dates (and sometimes different roadway alignments) to be merged into a common alignment date. When data has a common alignment date it can be used together with other data that has the same alignment date, such as displaying on a GIS layer.

*In 2003 WSDOT added 27 lane miles to the State Highway System.*

TRIPS has an internal ARM calculation process that manages the realignments on the mainframe. There is a similar PC-based product developed for client or server applications.

For more information contact (360) 570-2361

## State Highway Log

*The TDO collects and maintains information on more than **7,000 miles** of state highways.*

The State Highway Log is published annually and contains roadway information at 1/100th mile increments on all state highways. This log includes information such as surface type and pavement width, intersection location, speed limit, and lane mile totals. The features described in the State Highway Log are located using the DMI/LRS.

The TDO receives State Highway Log information through various sources such as: state highway construction contracts, developer agreements, utility contracts, annexation maps and input from WSDOT staff. This data is entered into TRIPS and can be accessed by mainframe users. This data is also available in hardcopy and electronic formats.

### Common Uses:

- Assist in pinpointing highway milepost locations when responding to customer inquiries such as locating and replacing damaged signs
- Combined with collision and traffic data, identifies High Accident Locations (HAL)

- Provide highway and lane mile totals used for allocation of federal funding, construction planning, and other uses
- Provide information needed for project scoping, planning, and highway design

To obtain this data visit:

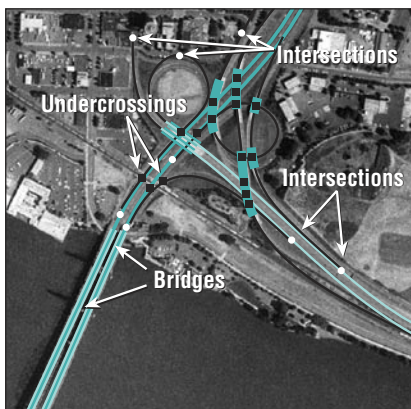
<http://www.wsdot.wa.gov/mapsdata/tdo/statehighwaylog.htm>  
or for more information contact (360) 570-2361

## Geographic Information Systems (GIS) Highway Log

The GIS Highway Log, which is updated annually, allows users to visually display highway features, such as bridges and interchanges, on a map. This data is based on the State Highway Log mile posting system (1/100th mile increments) and is compatible with GIS mapping software.

### Common Uses:

- When used with other GIS data, assists planners, engineers and others in identifying trends and future deficiencies for long-range planning
- Assist in accident analysis by showing the location of contributing factors such as number and type of lanes, legal speed limit zones, traffic control devices, types of medians, etc.
- Compare paved surfaces with flood data for impact and storm water planning
- Identify wildlife habitat areas and potential animal-crossing locations along our state highways



**An example of GIS Highway Log data overlaid on the 24k GIS base map**

To download this dataset visit:

<http://www.wsdot.wa.gov/mapsdata/geodatacatalog/default.htm>  
or for more information contact (360) 570-2363



## How are the GIS Highway Log and GIS files produced?

Data is extracted from TRIPS to produce the GIS Highway Log that can be linked to the 24k linear referencing GIS data layer. The 24k LRS data layer allows features, such as bridges, and events, such as collisions, to be displayed on a map based on their Accumulated Route Mileage (ARM). When realignments occur, the ARM values of the data extracted from TRIPS may no longer agree with the 24k linear referencing data layer. To make the data sources compatible the TRIPS data set is processed through the ARM/SRMP Calculation Module to match the date of the 24k data layer.

The completed GIS Highway Log is sent to WSDOT Office of Information Technology where it is imported into Environmental Systems Research Institute's (ESRI) Spatial Data Engine (SDE) and ESRI shape (.shp) files are created. Customers are encouraged to report data inconsistencies to the TDO. This provides the TDO the opportunity to improve the quality of the data.

## GPS/LRS Mainline

### Global Positioning System/Linear Referencing System

*GPS technology was developed by the US Department of Defense and is being used worldwide to identify locations by latitude/longitude/elevation (xyz) coordinates.*

The TDO has partnered with WSDOT's Geographic Services Office to develop a second, more accurate linear referencing system. This system is scheduled for completion in 2007 and will provide Global Positioning System (GPS) locations for all state highways including ramps. The TDO is collecting and processing geographic coordinates (x-longitude, y-latitude, z-elevation) in both directions of travel on

all state highways. The resulting GPS coordinate data will be used by Geographic Services to establish a GPS base map.

A GPS/LRS is a series of geographic coordinates that, when linked together, create a representation of each state highway as it appears on the earth's surface. As other offices in WSDOT collect data via GPS technology it is vital that WSDOT has a GPS-based LRS that can support the level of accuracy derived from GPS devices (+/- 5 ft).

Currently WSDOT uses a Linear Referencing System that is based on a Distance Measuring Instrument (DMI). The DMI measures the distance

*For every week of GPS data collected it may take three weeks to validate the route location by comparing with digital orthophotos and interchange diagrams.*

traveled by a vehicle from point A to point B, similar to an odometer. This technology is generally accurate to +/- 50 ft.

The data needed to produce the GPS/LRS Mainline is collected using a customized van driving each direction of travel on every state highway. On multi-lane highways, data is collected in the inside lane of travel (fast lane).

### **Current GIS Base Map Overlayed on an Orthophoto**



### **GPS/LRS Base Map Overlayed on an Orthophoto**



#### ***Common Uses:***

- Assist in identifying highway routing to direct emergency vehicles
- Provide a more accurate, universal method of locating and sharing data

For more information visit:  
<http://www.wsdot.wa.gov/mapsdata/tdo/gps.htm>  
 or contact (360) 570-2369

## **Road Log GPS Calculation Module**

### **A Conversion Tool for Placing Road log Features on the GPS/LRS Mainline**

Using GPS and GIS technologies, longitude (x), latitude (y) and elevation (z) locations are collected for “anchor points” that are stored in TRIPS such as bridge seats, intersections, and undercrossings. The xyz coordinates for the anchor points allow for the calculation of new GPS/LRS ARM values for these features.

Since the GPS/LRS system is new and does not correspond to the old system, this method was needed for converting existing DMI-based LRS ARM values (used by TRIPS) to GPS/LRS ARM values without recollecting all of the data.

With new GPS/LRS ARM values for these TRIPS anchor features, ratios between old ARM and new GPS/LRS ARM values can be established. Using these ratios, GPS/LRS ARM values can be calculated for all other features stored in TRIPS.

This is one of a set of tools that the TDO is developing to assist in the conversion between SRMP, TRIPS ARM, and GPS/LRS ARM values.

For more information contact (360) 570-2363

## GPS Training

*The TDO GPS Trainer is available to assist in the collection of GPS mapping grade data for WSDOT, other state, county and local agencies.*

The TDO is sharing its knowledge in GPS mapping and data collection by offering a one-day (8 hrs) and a two-day (16 hrs) training platform intended for personnel in WSDOT and other state, city, county and local agencies who collect GPS data for mapping accuracy. The courses are accessible through WSDOT Staff Development office with the title: GEN Introduction to GPS Mapping Grade Equipment Training. Course code for the 1-day class is CP8 and course code for the 2-day class is CP9.

A two-day advanced course is also available which encompasses the integration of external devices with GPS mapping equipment for data collection. Course title: GEN Advanced GPS Mapping Grade Equipment Training and course code: B9U.



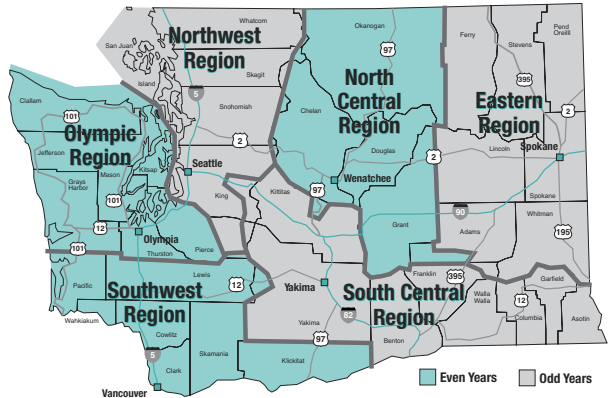
The GPS training program utilizes Trimble GPS mapping grade equipment.

For more information visit:

<http://www.wsdot.wa.gov/mapsdata/tdo/gpstraining.htm>  
or contact (360) 570-2372

## State Highway Video Program

Each year, approximately half of the state highway system is video taped and digitally captured using a specially equipped van while driving with the normal flow of traffic. The data is collected simultaneously for the Video Log, SRview 2.0 and SRview 360 and provides a visual record of each highway as well as its immediate environment. The data is collected in each direction of travel on every state highway. On multi-lane highways, data is collected in the outside lane of travel (slow lane), excluding climbing lanes or chain up areas.



## Video Log

The Video Log displays what the “driver” would typically see from a “front view” perspective as they proceed along the road. Video recording provides a continuous sequence of images with voice overlay reading the smaller signs for clarification.

Video logging is used primarily by the Office of the Attorney General to defend WSDOT in tort claims.

For more information visit:

<http://www.wsdot.wa.gov/mapsdata/tdo/video.htm>

or contact (360) 570-2361

## SRview 2

*On average SRview is accessed 5,000 times a month and serves over 1.5 million images, mini-mizing field reviews for WSDOT staff.*

SRview is a collection of digital photographs captured at 1/100th mile increments in both directions of every state highway. It is referenced using the DMI/LRS and allows a location in the State Highway Log to be viewed in SRview. You can also use SRview to travel on the road and view information in the State Highway Log.

### SRview 2



With SRview 2, users are able to virtually “drive” state highways by viewing digital images on their computer. Using two cameras, this system captures a “main-view” image in addition to a “side-view” image.

### Common Uses:

- Allow engineering staff to do preliminary site assessments from their computer
- Verify existing highway features and future needs: sign inventory and installation, sign quality, unstable slopes, utilities, topography around roadway, vegetation, monuments, etc.
- Facilitate plans review and phone discussions with public
- Assist WSDOT risk managers in verifying original highway features when recovering costs for damaged property
- Assist WSDOT staff to more accurately code collision locations

## **SR View 360°**

SRview 360° is an elevated 360° virtual tour of the surrounding roadway captured at 1/100th mile increments. Benefits beyond SRview 2 include a view of all intersection approaches to determine pavement markings, turning movements, signalization, illumination, signs, control boxes, fixed objects, etc.

For technical assistance with SR view e-mail [SRviewsprt@wsdot.wa.gov](mailto:SRviewsprt@wsdot.wa.gov)

For more information visit:

<http://www.wsdot.wa.gov/mapsdata/tdo/srview.htm>

or contact (360) 570-2361

## **Video Duplication Services**

The primary role of the Video Duplication Services is to duplicate and distribute state highway video log data. As workload permits, this section also responds to a variety of other video duplication requests such as training and safety films.

For more information visit:

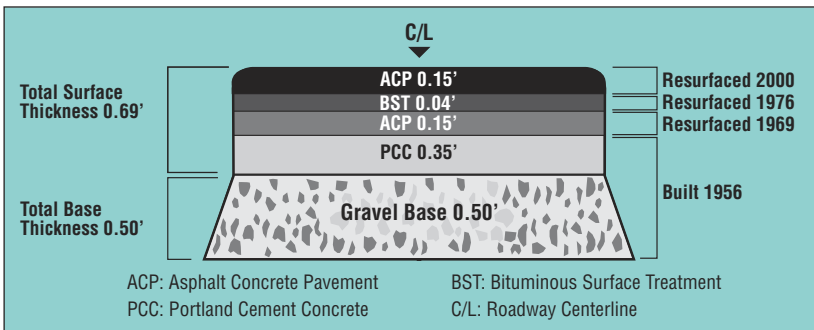
<http://www.wsdot.wa.gov/mapsdata/tdo/videolog.htm>

or contact (360) 570-2361

## Road Life Report

The Road Life Report, which is available upon request, contains coded historical contract information on all state routes, e.g., resurfacing, reconstruction, bridge widening and replacement, lanes added, etc. This serves as the primary data source for the Washington State Pavement Management System (WSPMS), which assists pavement managers in forecasting highway construction projects.

### Data Represented in a Road Life Report



For a sample of report content visit:

[http://www.wsdot.wa.gov/mapsdata/tdo/road\\_life.htm](http://www.wsdot.wa.gov/mapsdata/tdo/road_life.htm)

or for more information contact (360) 570-2361



## Horizontal/Vertical Alignment Report

The Horizontal and Vertical Alignment Report contains curve data extracted from state highway construction contracts. The horizontal data includes curve direction, length, radius, central angle and super elevation. The vertical data includes vertical point of intersection, percent of grade ahead and back, and curve length.

### *Common Uses:*

- Aid in determining the recommended curve speed
- Aid in determining sight distance required to safely pass a vehicle

For a sample of report content visit:

[http://www.wsdot.wa.gov/mapsdata/tdo/alignment\\_report.htm](http://www.wsdot.wa.gov/mapsdata/tdo/alignment_report.htm)  
or for more information contact (360) 570-2361

## Highway Classification Log

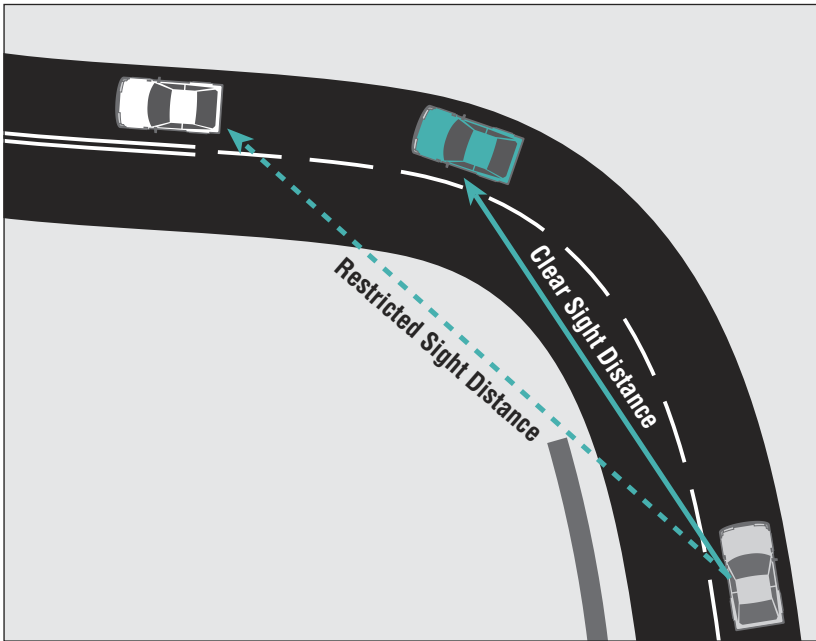
The Highway Classification Log is a listing maintained in TRIPS which includes information about items such as control sections, federal aid classification, maintenance area, urban area, region, HPMS section numbers, city, county, and legislative district boundaries.

For a sample of report content visit:

[http://www.wsdot.wa.gov/mapsdata/tdo/highway\\_classification\\_log.htm](http://www.wsdot.wa.gov/mapsdata/tdo/highway_classification_log.htm)  
or for more information contact (360) 570-2361

## Sight Distance Survey

A Sight Distance Survey is an assessment of a highway's configuration and alignment to determine the sight distance required to safely pass a vehicle. Sight distance requirements are based on the Manual of Uniform Traffic Control Devices (MUTCD) standards. Once sight distance is determined, appropriate no-passing zones can be established. This type of survey and data is vital in providing the traveling public with safe roadways.



Two vehicles are used to perform the survey which is used to determine unsafe passing zones. When the trailing vehicle can no longer see the lead vehicle, and certain engineering criteria are met, the location is marked for future no-pass striping.

For more information visit:

<http://www.wsdot.wa.gov/mapsdata/tto/rangetracking.htm>

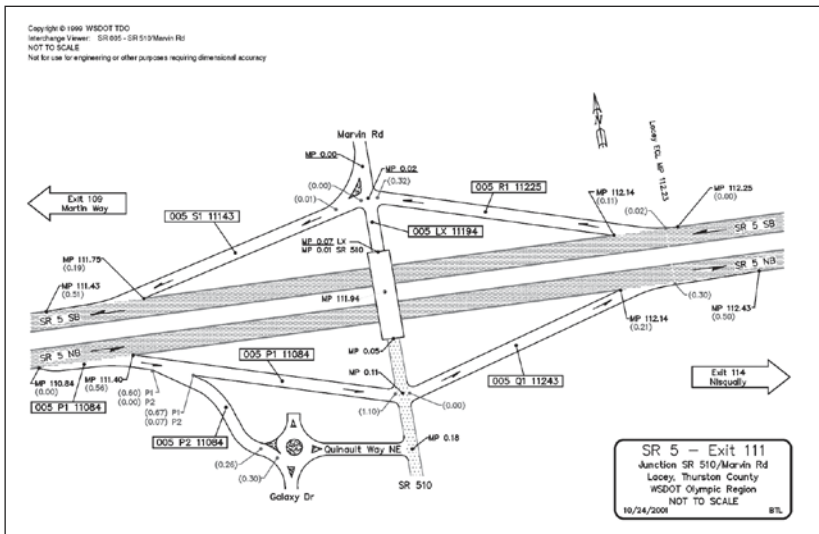
or contact (360) 570-2361

## Interchange and Other Roadway Drawings

The TDO creates and updates AutoCAD drawings of state route interchange areas, couplets, and other select locations for viewing in a program called “Interchange Viewer” or a public web application called “Interchange Web Viewer”. While not drawn to scale, these drawings can be used for locating accidents, ramp identification and other planning purposes.

The interchange drawings are updated through state highway construction contracts, subsequent on-site inspections, and input from WSDOT staff. The drawings are available in hardcopy and electronic formats.

### Sample of an Interchange Drawing



For more information visit:

<http://www.wsdot.wa.gov/mapsdata/tdo/roadwaydata.htm>  
or contact (360) 570-2361

To use the Interchange Web Viewer visit:

<http://www.wsdot.wa.gov/mapsdata/tdo/interchange>

## Roadway Data Mart

The Roadway Data Mart is a SQL server database that contains various types of roadway related data including but not limited to: lane miles, intersections, structures, horizontal and vertical, jurisdictional, roadway surface and width, control section, special use lanes and miscellaneous features to list a few. The data mart also provides the user with various canned reports that contain information on lane miles, functional classifications, structures and intersections.

The data mart is accessed using Hyperion, a web based software application and Internet Explorer. Using Hyperion, the user has the option of creating their own ad-hoc reports using the roadway data components contained within the Roadway Data Model.

For additional information on the Roadway Data Mart, visit: **(Internal to WSDOT)** [http://wwwi.wsdot.wa.gov/ppsc/tdo/roadway\\_datamart.htm](http://wwwi.wsdot.wa.gov/ppsc/tdo/roadway_datamart.htm)

For access to the Roadway Data Mart contact (360) 570-2361  
or e-mail: [TDORoadwayOpSupervisor@wsdot.wa.gov](mailto:TDORoadwayOpSupervisor@wsdot.wa.gov)

For technical assistance with Hyperion software, contact (360) 705-7700  
or e-mail: [OITQueryToolAdmin@wsdot.wa.gov](mailto:OITQueryToolAdmin@wsdot.wa.gov)

# State Highway Traffic Data

## Where does the traffic data come from and how is it validated?

### Automated Data Collection, Processing & Analysis

*In 2003, the TDO maintained 174 sites that collected data continuously 24 hours a day, 365 days of the year.*

The federal guidelines recommend a representative number of Permanent Traffic Recorders (PTR) and Weigh-In-Motion (WIM) sites be installed in the road surface throughout the State of Washington. The PTR and WIM sites provide knowledge of seasonal and day-of-week trends. (See Short Duration

Traffic Count for more information on how this trend data is used.)

The Transportation Data Office (TDO) electronics crew installs and maintains these continuously operating, data collection sites.

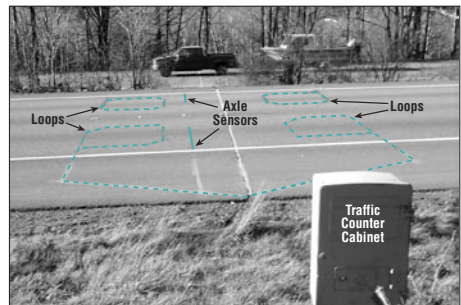
The crew performs site evaluation and layout, sets up traffic control, installs electronic sensors and the equipment that collects and stores the data. The data is later retrieved via modem by the TDO.

After installation, manual traffic counts are performed to ensure the site is counting correctly. A manual traffic count involves TDO staff member(s) counting and/or classifying vehicles for a short duration, which normally takes three hours to complete. Testing is repeated annually.

The most common installation used to collect traffic data includes two wire loops and one axle sensor for each lane to detect vehicles. The wire loops



Crew installing loops on SR 16 near Burley



Burley site on SR 16

detect vehicle volume, vehicle overall length and speeds. One type of axle sensor detects axles and spacing of axles. An algorithm is used to determine vehicle type. The other type of axle sensor performs like the first type, but is also sensitive enough to provide weight information for each axle and vehicle total weight. Depending on the type of sensors installed at each site, traffic data recorded and collected can include volume, vehicle classification, speed, and weight.

All Automated Data Collection (ADC) sites provide traffic volumes used to calculate Annual Average Daily Traffic (AADT). Most sites measure vehicle speed, weight, and differentiate between 13-classes of vehicles using Federal Highway Administration (FHWA) criteria. The 13-classes of vehicle data are then normally summarized into four groups that correspond to passenger cars/light trucks, single unit trucks, double unit trucks, and triple unit trucks.

The TDO performs data quality assurance by:

- Remotely monitoring field equipment for early detection of equipment problems and potential errors
- Retrieving and reformatting traffic data from field recorders for further processing
- Inventorying for anomalies such as time period gaps and equipment over counting
- Loading data to the Transportation, Information, and Planning Support (TRIPS) mainframe system and evaluating for trend anomalies
- Comparing manual traffic counts to recorded traffic data to verify accuracy

When developed in the early 1980s, TRIPS was not designed to store and report speed and weight data. Since those items have become a business requirement, the TDO stores, evaluates, and makes them available upon request.

For more information visit:

<http://www.wsdot.wa.gov/mapsdata/tdo/adc.htm>

or contact (360) 570-2392

## Short Duration Traffic Count

The TDO collects traffic volume and classification data (through tube counts and manual counts) on state highways and, upon request, other public roadways. Site selections are based on federal reporting requirements and/or regional engineers' requests.

*Approximately 2,000 short duration traffic counters are set annually.*

Documents completed in the field are used to record count location, direction of travel, count period, equipment performance, and data validity. The data is returned to the TDO and specialized software is used to download the data, perform validity checks, produce count statistics, and generate a report. The report is used for further data validation and count statistics are recalculated if appropriate. Data also submitted by WSDOT's regional data collection offices and other public and private entities is evaluated and used to generate count statistics. At the end of the year, annual traffic pattern information recorded by the ADC sites is used to establish annual average daily traffic volumes from short duration counts. The summarized data by location is maintained in TRIPS. Interval data (summarized to 15 minute or one hour) is available upon request in printed form.

### Common Uses:

- Develop planning studies and designing engineering projects by cities, counties, Regional Transportation Planning Organizations/Metropolitan Planning Organizations (RTPO/MPO), and WSDOT's regional offices
- Operational evaluation of channelization and traffic signalization by engineers and planners
- Commercial/residential development traffic impact analysis
- Business planning by private sector organizations
- Calculate traffic collision rates



Setting a short duration traffic counter and pneumatic road tubes on SR 101 near Olympia

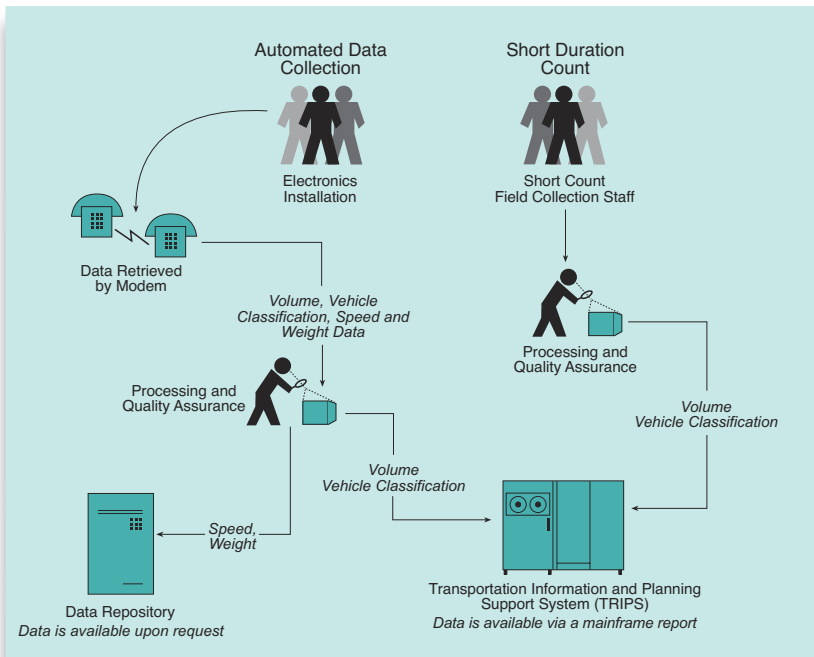
- Pavement management
- Datasets for GIS mapping
- Research projects (universities, federal, and private)
- Federal reporting of state highway traffic data
- Route development planning

For more information visit:

<http://www.wsdot.wa.gov/mapsdata/tdo/adc.htm>

or contact (360) 570-2378

### How is Traffic Data Collected, Processed, Evaluated and Reported?



For more information visit:

<http://www.wsdot.wa.gov/mapsdata/tdo/highwaybranch.htm>

or contact (360) 570-2373



## **How is traffic data compiled, statistically analyzed, and reported?**

The TDO's statistical analysts design customized diagnostic methods and analytical programs that enable WSDOT to determine patterns and factors for traffic planning, provide expert information to federal programs, and collaborate with transportation researchers.

These analysts maintain long-term summary databases and graphics to use in developing statistical products on request.

### **Expansion Factors**

This is a statistical ratio multiplied by a number of vehicles counted in a short time frame to extrapolate to a longer timeframe.

#### ***Common Use:***

- In computation of AADT from short-duration traffic counts

For more information contact (360) 570-2420

### **Axle Correction Factors and Vehicle Percentages by Vehicle Type and Functional Class**

This is a table containing traffic count data that is statistically weighted by functional class, season and day of week.

#### ***Common Use:***

- Highway Performance Monitoring System (HPMS), federal and local governments for national statistics and local application

For more information contact (360) 570-2420

## Travel Trends

Travel Trends is a summary table derived from three years of traffic count data showing percentages of seven vehicle groups for each highway functional classification.

### *Common Use:*

- Compute vehicle percents for HPMS, federal and local governments for national statistics and local applications

For more information contact (360) 570-2420

## Truck Weight Data

These are monthly truck totals classified by lane, vehicle type and weight (5,000 lbs increments) at weigh-in-motion sites.

### *Common Uses:*

- Supports the Strategic Highway Research Program/Long Term Pavement Performance (SHRP/LTPP) federal programs
- Freight and goods studies by national, state and local agencies
- Weight model building by national and state transportation researchers such as University of Washington Transportation Center (TRAC)

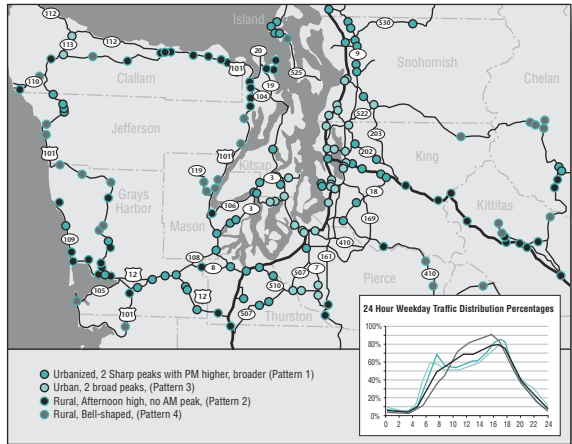
For more information contact (360) 570-2392

## Quality Assurance Software

These are customized Statistical Analysis Software (SAS) programs that generate analytical graphs and spreadsheets used to evaluate the quality and accuracy of traffic data.

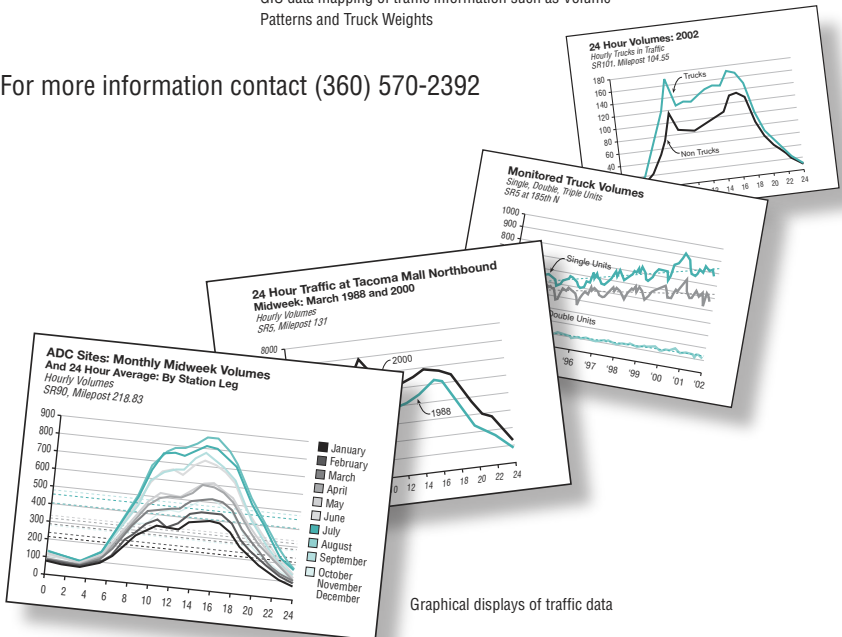
### Common Uses:

- Identify typical and non-typical traffic patterns
- Analyze for trends, representative data and to edit weight data
- Identify equipment problems at PTR sites



GIS data mapping of traffic information such as Volume Patterns and Truck Weights

For more information contact (360) 570-2392



Graphical displays of traffic data

## Automated Traffic Data Collection (ADC) Site Report

This is a monthly trend report showing Average Daily Traffic (ADT) at permanent traffic recording sites using a same-month three-year comparison.

### *Common Uses:*

- Traffic trend analysis:
  - Monitor traffic patterns over time
  - Monitor volume increases or decreases each month

To obtain this data visit:

<http://www.wsdot.wa.gov/mapsdata/tdo/adc.htm>

or for more information contact (360) 570-2392

## Hourly Volume Detail Reports

The Hourly Volume Detail Reports, which are available upon request, summarizes volume data by hour to determine peak hour, traffic patterns and volume statistics. These reports are a source of reliable information containing traffic vehicle counts with no distinction between vehicle types (does not identify motorcycles, automobiles, trucks), available in hourly, daily, directional and or by lane.

The reports are used in developing an Average Daily Traffic (ADT) total volumes, preparing traffic flow maps, determining volume trends, etc. Traffic volume counts are the most common measure of roadway usage and are needed as an input to the majority of traffic engineering analyses.

### *Common Uses:*















- Determine roadway width and length of turning lane
- Determine amount of existing delay in the system
- Scheduling of lane closures to do maintenance and construction
- Traffic signal timing
- Air quality analysis
- Design of traffic control systems

- Business planning by private sector organizations
- Compute average daily traffic

For a sample of report content visit:  
[http://www.wsdot.wa.gov/mapsdata/tdo/hourly\\_volume\\_detail\\_report.htm](http://www.wsdot.wa.gov/mapsdata/tdo/hourly_volume_detail_report.htm)  
or for more information contact (360) 570-2392

Hourly Traffic Classification Report

This report summarizes thirteen vehicle classification types into four bins by hour and direction.

VEHICLE CLASSIFICATION				
ALL OTHER	1. Motorcycles	2. Passenger Cars	3. Two Axle, 4 Tire Single Units	15. All Other Vehicles
				
SINGLE UNITS	4. Buses	5. Two Axle, 6 Tire Units	6. Three Axle Single Units	7. Four or More Axle Single Units
				
DOUBLE UNITS	8. Four or Less Axle Single Trailers	9. Five Axle Single Trailers	10. Six or More Axle Single Trailers	3
				
TRIPLE UNITS	11. Five or Less Axle Multi-Trailers	12. Six Axle Multi-Trailers	13. Seven or More Axle Multi-Trailers	4
				

Common Uses:

- Determine roadway width and length of turning storage
- Determine amount of existing delay in the system
- Traffic signal timing
- Air quality analysis
- Business planning by private sector organizations
- Pavement design
- Speed limit and oversize vehicle policy
- Forecast travel by vehicle type

- Identify safety conflicts due to vehicle mix and accident rates
- Determine amount of travel by vehicle type

For more information contact (360) 570-2392

## Annual Peak Hour Report

The Peak Hour Report is a list of Design Hour Factors (K and D) calculated from and including the highest 200 hours of hourly traffic volume collected from Automated Data Collection (ADC) sites monitored during the previous complete year.

K Factor is a peak hour traffic volume divided by the Annual Average Daily Traffic (AADT) for each ADC location without regard to direction, e.g.,  $K \text{ Factor} = \frac{1\text{st Peak Hour (traffic volume hour)}}{\text{AADT}}$ ; and,  $K30 \text{ Factor} = \frac{30\text{th Peak Hour (traffic volume hour)}}{\text{AADT}}$ .

D Factor is the highest directional volume percentage for the 30th peak hour. D Factors for all other peak hours are available by request.

### *Common Uses:*

- Determine traffic patterns
- Determine projected and estimated traffic volumes
- Determine project design purposes used by engineers, planning offices, and traffic office (state, county, city and private)

To obtain this data visit:

<http://www.wsdot.wa.gov/mapsdata/tdo/peakhourreport.htm>  
or for more information contact (360) 570-2392

## Quarterly Speed Report

The Quarterly Speed Report is a source of summarized speed data for state highways. The data is comprised of random three-day samplings (Tuesday through Thursday) within each calendar quarter.

### *Common Uses:*

- Conduct national research and analysis
- Calculate the 85th percentile which represents the speed at or below which 85% of the vehicles are traveling and is used in the decision making for speed limits and design speed setting
- Aid in determining Washington State Patrol emphasis patrol areas
- Congestion studies
- Evaluate vehicle speed trends within the state to assist in highway design, safety improvements, and in ascertaining general speed trends in accident locations

To obtain this data visit:

<http://www.wsdot.wa.gov/mapsdata/tdo/speedreport.htm>  
or for more information contact (360) 570-2392

## On-Demand Speed Reports

Speed Reports are a source of data containing traffic flow information collected in five (5) mile-per-hour increments by hour, by lane and by direction. This information is used for evaluating speed trends and to assist in highway design and or collision analyses (as it relates to speeds) by supplying the volume per speed group, average speeds, mean average and 85th percentiles.

For a sample of report content visit:

<http://www.wsdot.wa.gov/mapsdata/tdo/speedreport.htm>  
or for more information contact (360) 570-2392

## Truck Weight & Vehicle Classification – Data submittals

Volume, classification and weight data is sent monthly to the Federal Highways Administration (FHWA) and the Strategic Highway Research Programs/Long Term Pavement Performance Program (SHRP/LTPP). The data is collected and reported in compliance with the Traffic Monitoring Guide (TMG).

### *Common Uses:*

- Estimate pavement loading
- Evaluate existing design methods
- Pavement maintenance
- Develop improved design methodologies and strategies for the rehabilitation of existing pavements
- Develop improved design equations for new and reconstructed pavement
- Determine the effects of specific design features on pavement performance
- Determine the axle loads on the highway
- Determine the need for and success of weight law enforcement actions
- Determine the economic value of freight being moved on roadways

To obtain this data visit:

<http://www.wsdot.wa.gov/mapsdata/tto/peakhourreport.htm>  
or for more information contact (360) 570-2392

For more information on data link to FHWA National Database visit:

<http://apps.fhwa.dot.gov/vtris/>



## Annual Traffic Report

The Annual Traffic Report (ATR) is a summarization of traffic data collected by the permanent and short-duration sites.

The report includes:

- Annual Average Daily Traffic (AADT) totals and truck percentages, when available, for locations where data collection has occurred within the past four years
- A list of Automated Data Collection (ADC) station locations
- An annual summary of data from all operational ADC stations
- A table of Average Weekday Traffic (AWDT) to AADT conversion factors from all operational ADC stations
- Ten-year history of AADTs from ADC stations, ferry systems and toll crossings
- Annual Vehicle Miles Traveled (AVMT) information for the State Highway System
- A copy of the latest Washington State Traffic Flow Map
- A complete set of couplet diagrams for state highways

*On average, the ATR is accessed over 10,000 times annually on the web while 879 of paper/CD copies of the ATR are mailed.*

### Common Uses:

- Business planning by private sector organizations
- Determine roadway width
- Air quality analysis
- Design of traffic control systems
- Calculate collision rates
- Pavement design

To obtain this data visit:

<http://www.wsdot.wa.gov/mapsdata/tto/annualtrafficreport.htm>  
or for more information contact (360) 570-2381

## **Traffic Monitoring System for Highways (TMSH) Guidelines**

Also known as the Short Count Factoring Guide, this guide is intended to recommend high standards and uniform practices among traffic counting programs within the State of Washington so an accurate representation of traffic on our public roadways is available to all interested parties. It provides a general overview of traffic counting programs, as well as a more detailed discussion of suggested practices in relation to short duration traffic count field and office techniques.

### ***Common Uses:***

- A guide to construct an effective traffic counting program
- A resource describing how to generate and apply adjustment factors to estimate analyzed information from short-duration counts

For more information contact (360) 570-2381

## **Automated Data Collection (ADC) Location Report**

The ADC Location Report, which is available upon request, is a directory of Permanent Traffic Recorder (PTR) sites currently being monitored by WSDOT throughout the state highway system. This report supplies the assigned state highway route number, milepost location, PTR number, a short description of the site address and what capabilities the individual site has (able to collect speed (sp), volume (vol), classification (cl), weights (wt), etc.

For a sample of report content visit:

[http://www.wsdot.wa.gov/mapsdata/tdo/adc\\_location\\_report.htm](http://www.wsdot.wa.gov/mapsdata/tdo/adc_location_report.htm)

or for more information contact (360) 570-2392

## **AM/PM Traffic Summary Report**

The AM/PM Traffic Summary Report supplies information that represents monthly daily traffic volume totals with AM and PM subtotals, average daily, average Sunday, average Saturday, average weekend, average weekday, maximum daily totals and total number of days reported for the month. This information is available by direction and by combined directions.

For a sample of report content visit:

[http://www.wsdot.wa.gov/mapsdata/tdo/traffic\\_summary\\_report.htm](http://www.wsdot.wa.gov/mapsdata/tdo/traffic_summary_report.htm)

or for more information contact (360) 570-2392

## **Vehicle Classification Report (Four Bin Axle/Length Hourly)**

Classification Reports are a source of information containing traffic by vehicle type (motorcycles, cars, buses, single unit trucks and multiple unit trucks) which is available in hourly, daily and monthly. This report is generated by the count of vehicle axles or by predetermined vehicle lengths. Classification reports are used in establishing structural and geometric design criteria, computing expected highway user revenue, computing capacity (effect of commercial vehicles), determining axle factors for machine counts, freight mobility studies etc.

For a sample of report content visit:

[http://www.wsdot.wa.gov/mapsdata/tdo/vehicle\\_classification\\_report.htm](http://www.wsdot.wa.gov/mapsdata/tdo/vehicle_classification_report.htm)

or for more information contact (360) 570-2392

## Traffic Data Mart

Phase 1 of the Traffic Data Mart, scheduled to be completed in December 2004, will be a SQL server database that contains various types of traffic related data including but not limited to: vehicle volumes, classifications, speeds and weights to list a few. The data mart will also provide the user with various canned reports that contain information on Average Annual Daily Traffic (AADT), Average Daily Traffic (ADT), Average Weekly Traffic (AWDT), and peak hour traffic. In phase 2 of the Traffic Data Mart, we will add Annual Vehicle Miles Traveled (AVMT).

The data mart will be accessed using Hyperion, a web based software application and Internet Explorer. Using Hyperion, the user will have the option of creating their own ad-hoc reports using the traffic data components contained within the Traffic Data Model.

For additional information on the Traffic Data Mart visit: **(Internal to WSDOT)**  
[http://wwwi.wsdot.wa.gov/ppsc/tdo/traffic\\_datamart.htm](http://wwwi.wsdot.wa.gov/ppsc/tdo/traffic_datamart.htm)

For access to the Traffic Data Mart contact (360) 570-2392 or e-mail: [TDOADCPollingProcessingSupervisor@wsdot.wa.gov](mailto:TDOADCPollingProcessingSupervisor@wsdot.wa.gov)

For technical assistance with Hyperion software, contact (360) 705-7700 or e-mail: [OITQueryToolAdmin@wsdot.wa.gov](mailto:OITQueryToolAdmin@wsdot.wa.gov)

# Statewide Collision Data

## How do collision reports get processed and used for safety improvement identification?



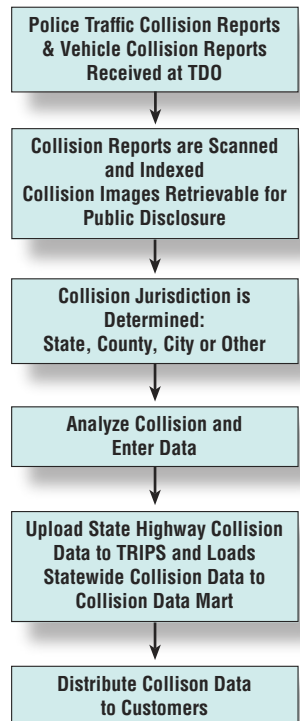
The National Highway Safety Acts of 1966 and 1973 require that each state have a centralized traffic collision records system; the Transportation Data Office (TDO) is responsible for Washington's collision records system. Each year, the TDO processes more than 130,000 Police Traffic Collision Reports (PTCR) and Vehicle Collision Reports (VCR) that are filed in the state of Washington. This includes managing, storing, safeguarding, retrieving, and releasing reports of collisions that occur on over 80,000 miles of our city streets, county roads,

and state highways. The availability of these reports has a significant impact on the lives of our citizens, governmental agencies, various businesses, and insurance companies.

The PTCR is used by all law enforcement agencies in the state to investigate reportable collisions (involving injury or meeting a minimum dollar damage threshold). The general public is required to submit a VCR for all reportable collisions that are not investigated by law enforcement officers.

Once the collision reports are received by the TDO, they are scanned and converted into electronic images. A limited amount of data is entered for each collision to serve as indexes for retrieving the collision image.

Quick and easy retrieval of these images is vital. Each year more than 40,000 public disclosure requests are processed for persons needing copies of collision reports. The fees collected for these requests result in the recovery of over \$200,000 per year in revenue for the state Motor Vehicle Fund.



The images and data are then loaded into the Collision Location and Analysis System - Electronic Document Workflow Management System (CLAS-EDWMS) for processing. Software then routes the images to the appropriate person for further analysis and coding to create the final collision record. Each final collision record contains information about the collision's location, type of impact, number and type of vehicles, and pedestrians or bicyclists involved. In addition, information about driver actions, weather conditions, level of injury for each occupant, seat belt usage and sobriety are captured.

*In the average two-vehicle collision, more than 100 data items are collected.*

There are different methods used to locate collisions, depending upon the jurisdiction of the roadway. State highway collisions are

assigned a state route number and milepost; city street collisions are located by primary and cross street; and county road collisions employ a road number and milepost provided by county engineers. (The TDO is exploring options that would allow city and county engineers to directly enter this location information into CLAS-EDWMS.) On a periodic basis, data for all of these jurisdictions is copied from CLAS-EDWMS into the Collision Data Mart and made available for queries and reports.

State highway collision data is uploaded to the Transportation Information Planning Support (TRIPS) system, a mainframe database that adds additional information to the collision records including:

- Functional Class
- Urban/Rural Code
- WSDOT Region
- City/County Number

TRIPS keeps track of collision locations when roadway lengths change (realignment) due to construction or the transfer of a roadway from one jurisdiction to another. Whether the state highway is lengthened or shortened, the original physical location of the collision must be maintained relative to the state highway's current status. This is accomplished through the use of Accumulated Route Mileage (ARM). ARM is an accrual of mileage from the beginning to the end of the route, and represents the route's true physical length at a given location. By using ARM to store each collision's location, TRIPS can ensure these locations remain accurate over time, whether or not realignments occur. In addition, should a portion of a state highway be replaced with a new physical alignment, TRIPS will transfer

those collision records that occurred on the former alignment into a history file. In this way, whenever this data is reported, the customer will know that these locations are no longer on the current state highway system.

## Collision Data Mart

The Collision Data Mart is a SQL server database that contains various types of collision-related data including but not limited to: location and severity; collision type; roadway, weather and light conditions; driver contributing factors, including sobriety; occupant restraint usage; vehicle information; and pedestrian or bicyclist information. The data mart allows users to run various “canned” reports, or create their own ad-hoc reports using any of the more than 100 collision data elements that are available to query. These reports can show data for collisions at a specific location, for an entire city or county, or for the whole state.

The data mart is accessed using Hyperion, a web based software application and Internet Explorer. Using Hyperion, the user has the option of creating their own ad-hoc reports using the collision data components contained within the Collision Data Model.

For additional information on the Collision Data Mart, visit: **(Internal to WSDOT)** [http://wwwi.wsdot.wa.gov/ppsc/tdo/collision\\_datamart.htm](http://wwwi.wsdot.wa.gov/ppsc/tdo/collision_datamart.htm)

For access to the Collision Data Mart contact (360) 570-2461 or e-mail: [TDOColDataSysAdmin@wsdot.wa.gov](mailto:TDOColDataSysAdmin@wsdot.wa.gov)

For technical assistance with Hyperion software, contact (360) 705-7700 or e-mail: [OITQueryToolAdmin@wsdot.wa.gov](mailto:OITQueryToolAdmin@wsdot.wa.gov)

## Identification of Safety Improvement Locations on State Highways High Accident Location/High Accident Corridor/Pedestrian Accident Location (HAL/HAC/PAL)

The HAL/HAC/PAL lists are used in developing WSDOT's safety programs and setting priorities for the allocation of safety funds.

- HALs are spot locations on state highways that have a higher than average rate of severe collisions over a two-year period.
- HACs are sections of state highways one or more miles in length that have a higher than average number of severe accidents occurring over a five-year period.
- PALs are spot locations on state highways that experience four or more pedestrian collisions during a six-year period.

*Collision data helps guide the annual investments in roadway safety improvements made by WSDOT (\$50-\$70 million).*

Typically a HAL is less than half a mile in length, while PALs are typically a tenth of a mile in length.

## On-Line Access to Collision Data in TRIPS

Historical state highway collision data beginning in 1993 is available in TRIPS. WSDOT staff can select collisions for locations ranging from a specific intersection, a section of highway, a city or county, a WSDOT Region, all the way up to the entire highway system, and produce a series of formatted reports based on the selection criteria. For example, collisions occurring on snow or ice on a particular bridge, or the number of state highway alcohol related fatalities for a year.

### *Common Uses:*

- Identify and prioritize high accident locations
- Assess the effectiveness of safety improvements
- Evaluate traffic collision patterns prior to design
- Review work zone design and operations
- Perform research into design standards
- Estimate impacts on safety due to proposed commercial developments



For more information or to see samples of report content visit:  
**(Internal to WSDOT)** <http://wwwi.wsdot.wa.gov/ppsc/tdo/trips.htm>  
or contact (360) 570-2451

## State Route Locator Log

The State Route Locator Log has been prepared primarily for use by investigating officers and the TDO to assist them in determining the accurate location of collisions on state highways.

The Locator Log, generated from TRIPS, is a list of milepost locations of identifiable highway features, private businesses and public services that exist along each state route. It is updated and printed annually by the TDO.

To obtain this data visit:  
<http://www.wsdot.wa.gov/mapsdata/tdo/locatorlog.htm>  
or for more information contact (360) 570-2461

## Annual Collision Data Summary

This report includes summary information on statewide collisions for the previous year along with historical trend analysis. Topics include collisions involving different groups, e.g., alcohol related, pedestrian, bicyclist, elderly and teenage driver, motorcycle, school aged children, seat belt usage, etc.

### *Common Uses:*

- Evaluate safety programs and policies (“Click It or Ticket”, Motorcycle Helmet Law, and Graduated Driver License)
- Provide information to decision makers
- Compare Washington’s experience with national and regional trends

To obtain this data visit:  
<http://www.wsdot.wa.gov/mapsdata/tdo/accidentannual.htm>  
or for more information contact (360) 570-2451

## Collision Record Electronic Data Feeds and Requests for Data

The data collected from the collision reports is used for a variety of purposes that help shape policy and strategic planning, assess the effectiveness of safety countermeasures, and identify locations requiring improvements. The TDO provides this information to WSDOT, other state agencies, cities, counties and the general public.

Each month, data files are made available electronically to local jurisdictions and the Washington Traffic Safety Commission, while a weekly feed is sent to the Department of Licensing. Upon request, collision data files, reports, images, and collision analyses are also provided subject to Public Disclosure rules and regulations.

### Common Uses:

- WSDOT, cities and counties use the data to identify and prioritize high accident locations; to assess the effectiveness of safety improvements; to evaluate traffic operations; to review work zone design and operations; and to perform research into design standards.
- Department of Licensing (DOL) uses the data to determine financial responsibility and update motorists' driving records. This results in \$20-\$30 million per year being awarded to injured parties by the courts.
- WSDOT, cities and counties use the information to recover repair costs resulting from collision-caused damage to highway appurtenances, e.g., guardrails, signs, structures, etc. (\$3- \$4 million recovered annually by WSDOT alone).
- Attorney General's Office uses the data to assist in tort claim defense. (Payouts vary from \$2-12 million a year).
- Washington Traffic Safety Commission (WTSC) uses the data to conduct research and trend analyses, to perform safety program evaluations, and to provide information to community safety advocates. The data also helps to support or draft legislation affecting such issues as seatbelt and helmet usage, and graduated driver licenses.
- The Fatality Analysis Reporting System (FARS), a federally mandated reporting system housed at WTSC, uses data from fatal collision reports

*Since 1994, the traffic fatality rate has declined 14% nationally, compared with a decrease of 12% in Washington State.*

to feed a nation-wide database. This allows in-depth research to be conducted on the causes of traffic fatalities, resulting in new laws and safer vehicle and roadway designs.

- Washington State Patrol (WSP) uses the data to identify areas for more effective enforcement (both private vehicles and commercial carriers).
- Superintendent of Public Instruction uses the data to analyze collisions involving school buses.
- Washington Utilities and Transportation Commission (WUTC) uses the data to analyze collisions occurring at railroad crossings.
- WSDOT Regions and consultants use the data to perform traffic analyses and impact studies.
- Media and the public use the data for reference and information.

For more information visit:

<http://www.wsdot.wa.gov/mapsdata/tdo/accidentdata.htm>

or contact (360) 570-2450

## Collision Report Copies

If you were involved in a collision in the State of Washington and would like to request a copy of the collision report, complete the “Request for Copy of Collision Report” form.

For a copy of the request form visit:

<http://www.wsdot.wa.gov/mapsdata/tdo/collisionreportrequest.htm>

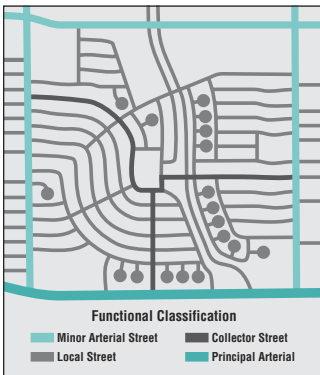
or contact (360) 570-2355

## Statewide Travel Analysis

### How is travel/traffic routed throughout the roadway network to perform logically and efficiently?

Functional classification defines the nature of this routing process by defining the part that any particular road or street should play in serving the flow of traffic through a roadway network.

#### Example of an Urban Street Network



The federal government requires WSDOT to be responsible for developing and updating a statewide roadway functional classification network to ensure efficient functional usage of the existing roadways. Federal guidelines are followed to achieve a functional balance based on established network mileage percentages. WSDOT cooperates with local officials and federal agencies in developing and updating the functional classification network.

WSDOT tracks this network in the functional classification database. This database is used to monitor and maintain the federally specified rural and urban

functional classification mileage ranges and in determining eligibility for federal aid funds.

When the functional usage of a roadway changes, the proposed classification change is submitted to the Federal Highway Administration (FHWA) for approval. WSDOT ensures that the proposed change meets functional usage criteria and sustains network flow. If approved, the changes are incorporated into the official record for the federal functional classification system.

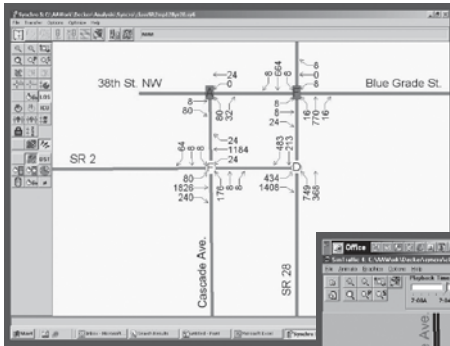
*All 80,000 miles of Washington's public roadways are classified in the federal functional system.*

For more information contact (360) 570-2370

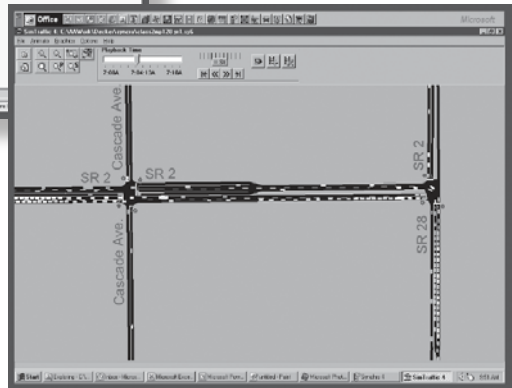
## Capacity Analysis

*The capacity of one lane on an urban freeway is 2,200 cars an hour.*

Capacity analyses determine if proposed roadway configurations can adequately accommodate existing and estimated future year traffic volumes.



Sample computer traffic model input



Simulation traffic model

### Common Uses:

- Ensure that new highways and modifications to existing highways are constructed with the most cost-effective use of financial resources
- Assist decision makers in prioritizing the construction schedules of proposed highway improvements
- Provide information for cost benefit analysis of proposed roadway projects

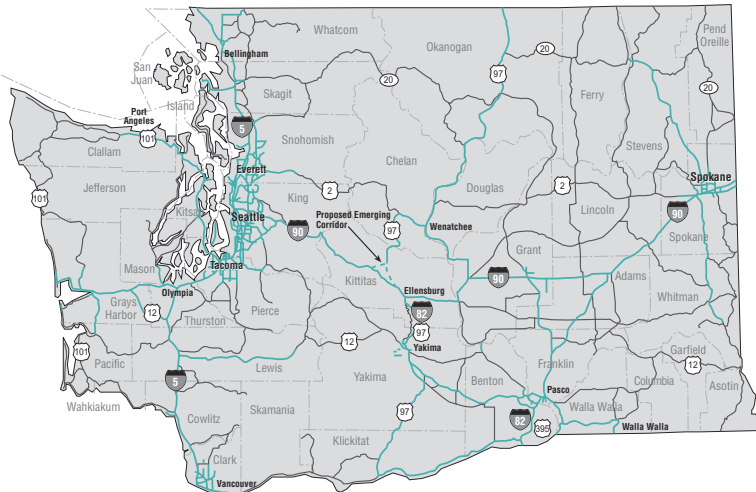
For more information contact (360) 570-2418

## What routes carry the bulk of the freight hauled?

### Freight and Goods Transportation System (FGTS)

Per RCW 47.05.021, the TDO is responsible for reporting annual tonnage on state routes for the Freight and Goods Transportation System (FGTS).

#### Strategic Freight Highway and Roadway Corridors - March 2001



Strategic freight corridors are those routes that carry at least four million tons of freight annually.

Traffic classification and weight data collected by the TDO is used to estimate the annual freight tonnage carried on state routes, and to identify strategic freight corridors.

#### Common Use:

- Identify freight routes of economic importance

To obtain this data visit:

<ftp://ftp.wsdot.wa.gov/public/Cartography/FreightAndGoods/300DPI/>  
or for more information contact (360) 570-2416

How does the State of Washington benefit from a federal roadway monitoring program?

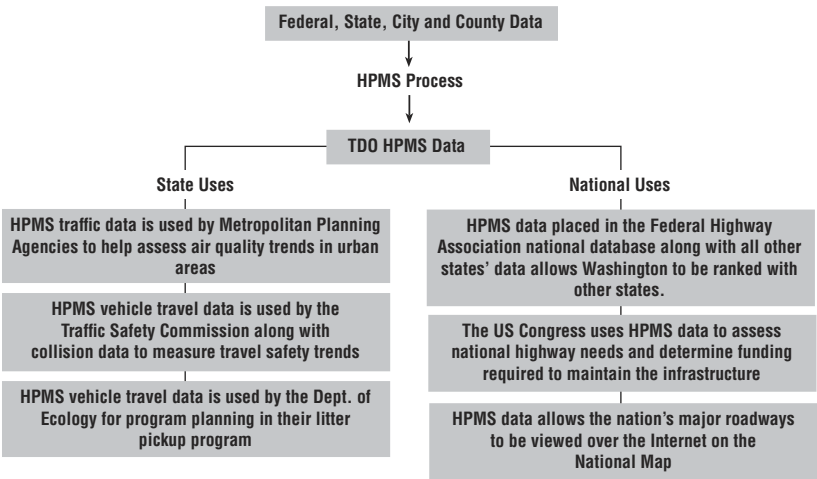
*HPMS data plays a major role in the amount of federal gas tax returned to Washington state.*

The TDO maintains the federal Highway Performance Monitoring System (HPMS) that is mandated by the Federal Highway Administration (FHWA) to report pavement condition, traffic performance, and safety related attributes for all roads in the state.

This data is used by FHWA for distributing national funds available to improve the state, city and county roadway systems. Based on HPMS reporting, the 2003 apportionment for Washington State is approximately:

Federal Funds Received	WSDOT	Local Governments
\$82 million Interstate Maintenance	100%	0%
\$91 million National Highway System	97%	3%
\$117 million Surface Transportation Program	20%	80%

The Highway Performance Monitoring System

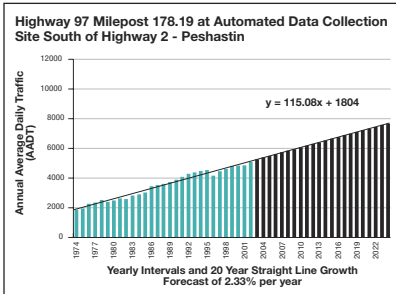


For more information visit:  
<http://www.wsdot.wa.gov/mapsdata/tdo/hpms.htm>  
or contact (360) 570-2370

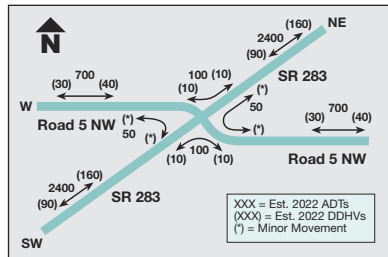
## What are some elements considered for the design of a project?

### Traffic Forecasting Analysis

Traffic forecasting analysis involves estimating current and future year average daily traffic volumes, peak hour volumes, and peak period truck percentages. This is accomplished by manually processing count data or by using computer simulation models.



Estimated 20-year growth rate



Design hour traffic based on estimated growth rate

### Common Uses:

- Estimated future year volumes are necessary for the design of roadway improvements
- Used by planning offices to identify roadway deficiencies to be considered when developing projects for inclusion in the WSDOT Highway System Plan
- Calculate future travel delay
- Used to determine geometrics of construction projects

To access the Traffic Forecasting Analysis request form visit:  
**(Internal to WSDOT)**

[http://wwwi.wsdot.wa.gov/ppsc/tfo/traffic\\_forecasting.htm](http://wwwi.wsdot.wa.gov/ppsc/tfo/traffic_forecasting.htm)  
or for more information contact (360) 570-2418



## **Traffic Models**

The TDO maintains a statewide traffic model to provide the official distance and travel time between cities using state routes. Other traffic models developed by the TDO provide information such as hourly traffic volumes and weight data over a 24-hour period or monthly variations over a year.

### ***Common Uses:***

- Travel analysis, research, and air quality reporting
- Congestion management
- Peak hour analysis

For more information contact (360) 570-2416

## **How is the traffic data in environmental and design reports validated?**

The TDO receives environmental and design report documents from WSDOT Headquarters, Regional Environmental and Design Offices, and FHWA for review. The TDO recommends corrections, additions, and clarification to traffic and capacity data as needed. This may require meeting with environmental and design staff from WSDOT and outside consulting firms in an effort to resolve identified deficiencies. The review process validates the accuracy and completeness of data used in the decision-making process.

For more information contact (360) 570-2421

## What helps to determine which project locations are funded?

### Mobility Project Prioritization Process Manual and Workbook

As one element in the project selection process WSDOT does a benefit cost analysis of every proposed capacity improvement project. The TDO supports this effort by providing the methodology, training of regional staff, and review for the benefit side of this exercise. The regions are responsible for the cost piece. We then maintain the final benefit cost results for future reference.

The manual and the workbook provide the methodology to estimate benefits for the following types of WSDOT project elements:

- Safety benefits
- Add general purpose or climbing lane benefits
- High occupancy vehicle (HOV) lane benefits
- Two-way left turn lane (TWLTL)/access management benefits
- Intersection improvement benefits
- New interchange benefits
- Park and ride lot benefits

#### *Common Uses:*

- List developed of proposed projects with benefit cost
- Provide uniform and consistent methodology within WSDOT

For an electronic version of the manual and workbook visit:

**(Internal to WSDOT)** <http://wwwi.wsdot.wa.gov/ppsc/tdo/mobility.htm>  
or for more information contact (360) 570-2416

## What helps limit the time a lane or road is closed for construction?

### Interim Liquidated Damages for Construction Contracts

The TDO is responsible to approve the calculation of societal cost resulting from travel delays experienced by the traveling public as a result of a failure to open a roadway segment to traffic as specified in a contract. These costs are a justification for the monetary penalty charged to the contractor. The calculations may influence the type and timing of the work zone traffic control used in the contract.

#### *Common Uses:*

- Supplement the standard specifications via the contract special provisions
- Encourage the timely removal of traffic control

To access the Interim Liquidated Damages Request Form visit:  
**(Internal to WSDOT)**

[http://wwwi.wsdot.wa.gov/ppsc/tdo/liquidated\\_intro.htm](http://wwwi.wsdot.wa.gov/ppsc/tdo/liquidated_intro.htm)  
or for more information contact (360) 570-2418

## Contacts

### Administrative Support Services

Administrative Support Services Manager - David Fennell	(360) 570-2426
General Information	(360) 570-2350
Collision Report Copies	(360) 570-2355

### Collision Data

Collision Data & Analysis Branch Manager - John Dunn	(360) 570-2452
Annual Collision Data Summary	(360) 570-2451
Collision Record Data Feeds and Requests for Data	(360) 570-2450
On-Line Access to Collision Data	(360) 570-2451
State Route Locator Log	(360) 570-2461

### Information Technology

IT Branch Manager - Nadine Jobe	(360) 570-2398
Application/System Coordinator	(360) 570-2432
Project Development	(360) 570-2412
Research & Development	(360) 570-2407
SRview Technical Support	(360) 570-2401
Web & Media	(360) 570-2402

### Roadway Data

Roadway System Branch Manager - Mark Finch	(360) 570-2369
ARM/SRMP Calculation Module	(360) 570-2361
DMI/LRS	(360) 570-2361
GIS Highway Log	(360) 570-2363
GPS Training	(360) 570-2372

GPS/LRS Mainline	(360) 570-2369
Highway Classification Log	(360) 570-2361
Horizontal/Vertical Alignment Report	(360) 570-2361
Interchange and Other Roadway Drawings	(360) 570-2361
Road Life Report	(360) 570-2361
Road Log GPS Calculation Module	(360) 570-2363
Sight Distance Survey	(360) 570-2361
SRview 2.0/360	(360) 570-2361
State Highway Log	(360) 570-2361
Video Duplication Services	(360) 570-2361
Video Log	(360) 570-2361

## Traffic Data

Highway Usage Data Branch Manager - John Rosen	(360) 570-2373
ADC Location Report	(360) 570-2392
ADC Site Report	(360) 570-2392
AM/PM Traffic Summary Report	(360) 570-2392
Annual Peak Hour Report	(360) 570-2392
Annual Traffic Report	(360) 570-2381
Automated Data Collection and Processing	(360) 570-2392
Axle Correction Factors and Vehicle Percentages by Vehicle Type and Functional Class	(360) 570-2420
Expansion Factors	(360) 570-2420
Hourly Traffic Classification Report	(360) 570-2392
Hourly Volume Detail Reports	(360) 570-2392
Quality Assurance Software	(360) 570-2392
Short Duration Traffic Count	(360) 570-2378
Speed Report	(360) 570-2392
TMS/H Guidelines	(360) 570-2381
Travel Trends	(360) 570-2420
Truck Weight Data	(360) 570-2392

Truck Weight & Vehicle Classification  
 - Data Submittals (360) 570-2392

Vehicle Classification Report (360) 570-2392

## Travel Analysis

Travel Analysis Branch Manager -  
 Dave Bushnell (360) 570-2416

Capacity Analysis (360) 570-2418

Freight and Goods Transportation System (360) 570-2416

Functional Classification (360) 570-2370

HPMS (360) 570-2370

Interim Liquidated Damages for  
 Construction Contracts (360) 570-2418

Mobility Project Prioritization Process  
 Manual and Workbook (360) 570-2416

Traffic Forecasting Analysis (360) 570-2418

Traffic Models (360) 570-2416

Validation of Traffic Data  
 - Environment and Design (360) 570-2421

## TDO Acronyms

### A

AADT	Annual Average Daily Traffic
ADC	Automated Data Collection
ADT	Average Daily Traffic
ARM	Accumulated Route Mileage
ATR	Annual Traffic Report
AVMT	Annual Vehicle Miles Traveled
AWDT	Average Weekday Traffic

### B

BAL	Bicycle Accident Location
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### C

CLAS	Collision Location and Analysis System
CLCF	County Location Coding Form
CRASH	Collision Reporting and Statistical History
CRAB	County Road Administration Board
CVE	Commercial Vehicle Enforcement

### D

DVMT	Daily Vehicle Miles Traveled
DDHV	Directional Design Hourly Volume
DMI	Distance Measuring Instrument

### E

EDWMS	Electronic Document Workflow Management System
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### F

FARS	Fatal Analysis Reporting System
FGTS	Freight and Goods Transportation System
FHWA	Federal Highway Administration
FMSIB	Freight Mobility Strategic Investment Board

### G

GIS	Geographic Information System
GPS	Global Positioning System

## H

HAC	High Accident Corridor
HAL	High Accident Location
HOV	High Occupancy Vehicle
HPMS	Highway Performance Monitoring System
HSIG	Highway Safety Issues Group
HSIS	Highway Safety Information System
HSRC	Highway Safety Research Center

## I

I/C	Interchange
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## L

LRS	Linear Referencing System (DMI based)
LTC	Legislative Transportation Committees
LTTP	Long Term Pavement Performance

## M

MLMP	Mainline Milepost
MMUCC	Model Minimum Uniform Crash Criteria
MPO	Metropolitan Planning Organization
MUTCD	Manual on Uniform Traffic Control Devices

## N

NHTSA	National Highway Traffic Safety Administration
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## O

OFM	Office Financial Management
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## P

PAL	Pedestrian Accident Location
PTCR	Police Traffic Collision Report
PTR	Permanent Traffic Recorder

## R

RRQ	Related Roadway Qualifier
RRT	Related Roadway Type
RTPO	Regional Transportation Planning Organization



## S

SAS	Statistical Analysis Software
SHRP	Strategic Highway Research Program
SPI	Superintendent of Public Instruction
SR	State Route
SRMP	State Route Mile Post
SP&P	Strategic Planning & Programming

## T

TARIS	Traffic, Accident, and Roadway Information System
TDO	Transportation Data Office
TMG	Traffic Monitoring Guide
TMS	Traffic Monitoring System
TMSH	Traffic Monitoring System for Highways
TRAC	TRAnsportation Center
TraCS	Traffic and Criminal Software
TRC	Traffic Records Committee
TRIPS	TRAnsportation Information and Planning Support
TSIMS	Traffic Safety and Information Management System
TWLTL	Two-Way Left Turn Lane

## V

VCR	Vehicle Collision Report
VMT	Vehicle Miles Traveled






## W

WIM	Weigh-In-Motion
WSDOL	Washington State Department of Licensing
WSDOT	Washington State Department of Transportation
WSP	Washington State Patrol
WTSC	Washington Traffic Safety Commission
WUTC	Washington Utilities and Transportation Commission

## Data Resource Information

The TDO acquires data from many sources that are combined into information systems to provide WSDOT business area, other government agencies and the general public with highway geometric, traffic and collision data and information. These systems provide both current and historical information.

### Where does the data come from and how is it made available?

Type of Data	Source of Data		Information Systems
Roadway	<ul style="list-style-type: none"> <li>Construction contracts</li> <li>Federal classifications – Federal Highway Administration</li> <li>Input from WSDOT staff</li> <li>Assignment of state route numbers – Legislative Transportation Committees</li> <li>City and county information – Office of Financial Management</li> <li>Legislative district number – Redistricting Committee</li> <li>TDO field reviews</li> <li>Bridge number, structure identification – WSDOT Bridge Preservation</li> <li>Access control – WSDOT Design Office</li> <li>Annexation maps – WSDOT Geographic Services</li> <li>Pavement type information – WSDOT Pavement Management</li> <li>Maintenance area and section information, developer agreements, utility contracts – WSDOT Regions</li> <li>Speed limit information – WSDOT Traffic</li> <li>Weigh station information – Washington State Patrol</li> </ul>		<ul style="list-style-type: none"> <li>TRIPS</li> <li>TARIS Database</li> <li>Roadway Data Mart</li> </ul>
Collision	<ul style="list-style-type: none"> <li>Citizen Reports</li> <li>County Location Coding Forms</li> <li>Officer Reports</li> </ul>		<ul style="list-style-type: none"> <li>TRIPS</li> <li>TARIS Database</li> <li>Collision Data Mart</li> </ul>
Traffic	<ul style="list-style-type: none"> <li>Permanent Traffic Recorders – WSDOT TDO, WSDOT Regions, Oregon Department of Transportation</li> <li>Short Duration Counts – WSDOT TDO, WSDOT Regional Counts</li> </ul>		<ul style="list-style-type: none"> <li>TRIPS</li> <li>TARIS Database</li> <li>Traffic Data Mart</li> </ul>
SRview	<ul style="list-style-type: none"> <li>Images collected using specially equipped vans</li> </ul>		<ul style="list-style-type: none"> <li>Web and PC applications for viewing images</li> </ul>
Interchange Viewer	<ul style="list-style-type: none"> <li>Construction contracts</li> <li>Input from WSDOT offices and field reviews</li> </ul>		<ul style="list-style-type: none"> <li>Web and PC applications for viewing interchanges</li> </ul>

